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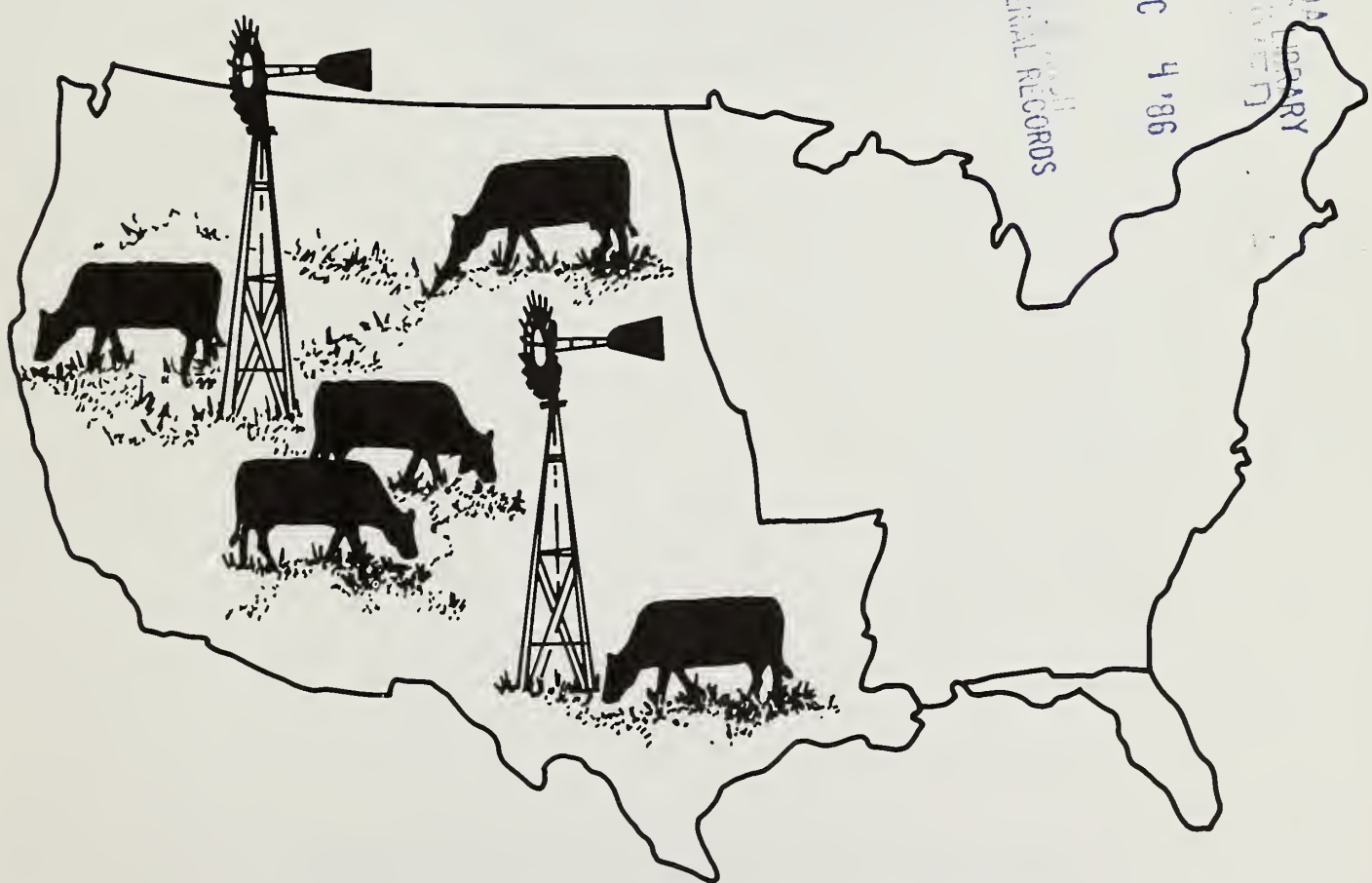
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General Technical
Report RM-133



Range Forage Data Base for 20 Great Plains, Southern, and Western States

Linda A. Joyce, David E. Chalk, and Andrew D. Vigil



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Abstract

This paper documents the development and structure of the RANGE FORAGE data base, a subset of information from all Soil Conservation Service Range Site Descriptions for 20 states: Arkansas, Arizona, California, Colorado, Florida, Idaho, Louisiana, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, Wyoming. Information in the data set includes range site name, location identifiers, total annual production, soils information, and initial stocking level rates. Data is accessible via tape from the USDA Fort Collins Computer Center. This data can be used to analyze range site productivity within a state, between states or across regions.

Range Forage Data Base for 20 Great Plains, Southern, and Western States

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MANAGEMENT IMPLICATIONS

This report describes the content and accessibility of a rangeland data set based on the Soil Conservation Service (SCS) Range Site Descriptions. A range site is an ecological subdivision of the landscape based on the ability of that site to produce a characteristic natural plant community (USDA Soil Conservation Service 1976). Range Site Descriptions were developed by SCS to help plan and carry out resource conservation programs on rangeland and other native grazing land. Previously, Range Site Descriptions were available within each state SCS office in written form only. A subset of the information available in each Range Site Description was extracted and placed on a computer for use in the periodic national assessment of rangelands and forestlands by the Forest Service (see USDA Forest Service 1980 for a description of the 1979 Assessment). This rangeland data set describing herbaceous production and stocking rates by range sites will be linked to an inventory data base and will be used to project the supply of grazing on rangelands.

RANGE FORAGE, the rangeland data, contains a subset of information taken from all SCS Range Site Descriptions for 20 states: Arkansas, Arizona, California, Colorado, Florida, Idaho, Louisiana, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. This information includes: range site name, location identifiers, soils information specific to the range site, Soils Interpretation Record number associated with the soil taxonomic unit, total annual production in pounds per acre, and animal stocking guide in acres/animal unit months. Because Range Site Descriptions are standardized in form only, not content, at the national level (USDA Soil Conservation Service 1976), this report documents the differences between states with respect to this subset of information taken from the Range Site Descriptions. This data set is accessible to the reader via a tape at the USDA Fort Collins Computer Center in Colorado.

Information contained within each range site description could be analyzed within a state or across states within a region. Herbaceous production estimates and stocking levels could be used to quickly evaluate range site potentials within soil type groups, for example. Such an analysis would facilitate range site-soil type correlations between states. Regional variations in herbaceous production have been examined using this data set (Sala et al. 1985). The data also could be used as a starting point to automate revisions of existing Range Site Descriptions and the development of new Range Site Descriptions.

INTRODUCTION

A range site is a characteristic natural plant community typified by an association of plant species that differ from other range sites in either the kind or proportion of species or in the total standing crop of biomass produced on the site (USDA Soil Conservation Service 1976). The range site descriptions define a site as a function of environmental factors including climate, physiography, soils, and the plant community. Descriptions of range sites are used as the basic ecological data for planning the use, development, rehabilitation, and management of rangeland. The development of a Range Site Description is standardized at the national level by the procedures outlined in the National Range Handbook (USDA Soil Conservation Service 1976). Individual range site descriptions are developed within each state and are unique to that state.

The objective of this work is to compile a national level data base on range productivity. Data used to assess the U.S. rangeland production must be nationally consistent and represent current range management. Information contained in the range site descriptions meets both criteria.

In order to link RANGE FORAGE to other national level data sets, common data elements must be present. Other national level data sets of interest include the 1981–1982 SCS Natural Resources Inventory (NRI), the Soil Interpretation Records (USDA Soil Conservation Service 1983), and the Map Unit Use File (USDA Soil Conservation Service 1983). Linkage with the NRI required inclusion of the Major Land Resource Areas (MLRAs) (USDA Soil Conservation Service 1981) associated with each range site, because MLRAs are also used to identify NRI sample points. Only rangeland and soil type were used to identify the NRI sample point for which range condition was taken; thus, soil taxonomic units associated with each range site were included in the RANGE FORAGE data base. Many soil series can be associated with one range site. A range site in Nebraska may have as few as 1 or as many as 17 soil taxonomic units associated with it. Thus, the combination of MLRA, soils, and range sites for a state will be much greater than the number of range sites only. A state such as Nebraska, which has 80 range sites, has 4,381 MLRA-range site-soil combinations. These combinations are referred to here as range site-soils combinations.

STRUCTURE OF RANGELAND DATA

A standard set of information (table 1) was taken from all range site descriptions available as of 1984 for each

Table 1. Range site information contained within the RANGE FORAGE data base.

Geographic Location Identifiers
State
Region
Major Land Resource Area
Unique state land division codes
Precipitation (inches)
Range Site Name
Soil Information
Soil Taxonomic Unit Name
Texture, texture modifiers, and phase/class description
Slope
Soil Interpretation Record Number
Total Annual Production (lb/acre)
Initial Stocking Rates (AUMs)

of these 20 states: Arkansas, Arizona, California, Colorado, Florida, Idaho, Louisiana, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. The major categories included geographic location identifiers, range site name and identifiers, soil descriptions, total annual production and initial stocking rates. Information available within each range site varied by state. For example, some states used land divisions unique to that state rather than the MLRAs to describe the broad geographic location of the range site. Typical soil taxonomic units usually were given in each range site description. Additional information concerning soil texture, texture modifiers, and phase/class descriptions were included in RANGE FORAGE only if such information defined the range site.

Geographic Location Identifiers

Most states identified broad geographic locations for the occurrence of the range sites using the Land Resource Regions and MLRAs of the United States (USDA Soil Conservation Service 1981). Region is described by a 1-letter alphabetical code, such as F, for the Northern Great Plains Spring Wheat Region, and a 3-number code described the Major Land Resource Area within the Region, such as 53 for the Dark Brown Glaciated Plains MLRA within Region F (USDA Soil Conservation Service 1981). Subresource areas have been identified for some MLRAs, and are coded by a 1-letter alphabetical code, such as A for Northern Dark Brown Glaciated Plains, and B for Central Dark Brown Glaciated Plains. The 1978 map and 1981 documentation of MLRAs and Regions provide a national description of this land system, and state MLRA maps are also available for some states.

Additional subresource areas not on the 1978 map and missing subresource areas for MLRAs which had subresource areas on the 1978 map were handled as follows. If the range site description provided a MLRA and a subresource area, but the subresource area was not on the national map, the subresource area was coded into the data base. A more refined map of the state would be necessary to define the boundaries of this subresource

area. If the range site description gave only the MLRA 36, for example, and the 1978 national map defined subresource areas (i.e., 36A and 36B) then the subresource area was considered to be missing and was assigned according to this procedure. If MLRA 36A only occurred in the state (and not 36B) then the range site was assigned MLRA 36A. However, if both 36A and 36B were found in the state, and the range site description did not specify any locations, either by county or other state subdivisions, then the range site was assigned the MLRA 36. If the description did specify locations then the MLRA which fell within those locations was assigned to the range site.

North Dakota, Wyoming, and Nebraska used land division codes unique to their states; these codes were retained in RANGE FORAGE. Several states used additional state divisions. Texas was divided into potential evapotranspiration (PE) classifications.

Precipitation zones were used to define the average annual precipitation in inches. If low and high values were given, then both values were coded. If only one value was given, it was coded according to whether it was a greater than or less than value. If 20 inch plus was given, indicating the precipitation was greater than or equal to 20 inches, it was coded in the low precipitation column. If <20 inches was given, it was coded in the high precipitation column indicating 20 inches as a maximum value.

Soils Information

Range site descriptions reported typical or major soil taxonomic units associated with each range site. Soil taxonomic units varied from soil series to order to soil mapping unit, with most range sites described by one or more soil series.

If texture was used to further specify soil type, it was coded using SCS standard abbreviations shown in Appendix 3 (USDA Soil Conservation Service 1983). If a texture modifier was used to further specify soil texture, it was coded using SCS standard abbreviations shown in Appendixes 3 and 4 (USDA Soil Conservation Service 1983). If slope was used to further define the soil type, it was included into the data base. High and low values were coded in the same manner as the precipitation values.

If the phase/class description was used to further define soil type, it was coded using SCS standard abbreviations shown in Appendix 4 (USDA SCS 1983). If the phase/class did not have a standard abbreviation, the entire description was recorded. This category also was used to describe some soil variations, such as Hardpan. Textural modifiers given in parentheses in the descriptions also were placed in this category.

The Soil Interpretation Record Number, commonly called the Soils 5 number, was included to link this data base with other national level data bases, such as the SCS NRI. Soils 5 numbers are associated with soil series, families, and orders, varying by state (USDA Soil Conservation Service 1983). This number was not given in the individual range site descriptions. The Soils 5

numbers for individual soils were obtained from the Iowa State University data base in June 1984.

Because range site soil descriptions using series and texture may not correspond exactly with series defined in the Soil Interpretation data base, a procedure was developed to assign Soils 5 numbers to these soil series. If the range site description contained a soil series with a texture specification but the Soil Interpretation Record data base contained the soil series without a texture assignment, then that Soils 5 number was assigned to the soil series in RANGE FORAGE. If the Soils 5 list contained the same series but a different texture, no number was assigned to the soil series in this data base. If the Soils 5 list contained the same series and texture as the range site, but had a modifier such as "very" (e.g., very gravelly), then that Soils 5 number was assigned to the soil series in this data base. The Soils 5 number may represent a more general class of texture than the range site description, and the actual texture given in the Description (and coded into this data base) should be checked when the Soils 5 numbers are used. Any correspondence between texture and productivity should use the texture values coded with the soils in this data base, not the Soils 5 numbers.

Production Information

Total annual production was given in air dry weight as pounds per acre on an excellent condition site for favorable and unfavorable years, as well as the median year. Any information given in the guides on the development of these estimates was included in the discussion of each state range site descriptions.

Range site descriptions gave stocking rates to guide the initial stocking of domestic livestock on a site. Initial stocking rates were coded into this data base as acres per animal unit month (AUM) by condition class. Condition class definitions were standard: excellent = 76–100% of the climax vegetation, good = 50–75% of the climax vegetation, fair = 26–50% of the climax vegetation, and poor = 0–25% of the climax vegetation. If stocking rates were given by favorable and unfavorable years and not by condition classes, no values were coded. If stocking rates were given by favorable and unfavorable years, and by condition classes, then the favorable year values by condition classes were coded into this data base.

If stocking rates were given as a range from low to high acres per AUM, then the low and the high values of the range were coded into RANGE FORAGE. Stocking rates for the poor condition class usually were recorded as N + acres/AUM, implying that the stocking level should be greater than N acres. This value was always coded in the low end of the poor condition stocking rate columns. If stocking rates were given as a single number for each condition class, then that single number was coded in the low columns for each condition class. The high value of the range was left blank; no value was coded.

RANGE SITE DESCRIPTIONS BY STATE

The data contained within the range site descriptions across states is summarized in table 2. Information content of range sites descriptions varied by state. Assumptions associated with data from range sites by states are described in the individual state descriptions.

Table 2.—Information reported in the range site descriptions by state.

State	Number Range Sites	Annual Production	Stocking Level	Soils	Number of Combinations	Year of Report
Arkansas	44	X		X	1952	1962
Arizona	276	X	X	X	1585	1982
California	189	X	–	X	1448	1964–80
Colorado	151	X	X	X	1134	1975–84
Florida	13	X	X		13	1983
Idaho	265		X	–	1279	1971–82
Kansas	63	X	X	X	428	1982–84
Louisiana	2	X	X	X	4	
Montana	122	X	X	X	382	1978–81
Nebraska	80	X	X	X	4381	1981
Nevada	210	X		–	216	1981–83
New Mexico	202	X	X	X	990	1977–83
North Dakota	59	X	X	X	626	1975–84
Oklahoma	100	X		X	688	1960–71
Oregon	226	–	X	X	534	1968–81
South Dakota	84	X	X	X	947	1979
Texas	827	–	–	–	2535	1972–81
Utah	84	X		X	2537	1971–78
Washington	25	X	X	X	581	1981–83
Wyoming	250	X	X	–	756	1977–81

X all range sites
– some range sites

Arizona

Arizona had a total of 276 range sites² identified by Region, MLRA, and subresource area. Precipitation zones were recorded with each range site. In contrast with other states where topography was more homogeneous, MLRAs sometimes had more than one precipitation zone.

Soils Information

The number of major soils associated with each range site varied from 1 to 12. Soil series were given most commonly; but in some cases, the family or order was given. For some soils, several textures were associated with that soil and range site. Soils 5 numbers were available for approximately 90% of soil taxonomic units. Only one range site did not have a representative soil: Volcanic hills 2 to 7 inch precipitation zone (p.z.) MLRA 30, 31.

Total annual production for an excellent condition site was given for all range sites in pounds of air dry herbage per acre for favorable, unfavorable, and normal years.

Initial Stocking Rates

Initial stocking rates were given as a guide to establishing a safe starting stocking rate, with the caution that the stocking level and the livestock numbers should be adjusted based on actual use experience and climatic fluctuations. The units are acres per AUM, consistent with all other states in this data base.

Some range site descriptions did not report stocking levels. For Saline Bottom and Saline Subirrigated, the variability of production and dominance of nonforage plants was such that stocking rates could not be predictably estimated. For Breaks, 7 to 12 inch p.z., the range site guide states that this site is not normally grazed and does not occupy a significant portion of range. Therefore, a stocking allowance should not be made because it would encourage overuse of adjacent sites. For Breaks, 10 to 14 inch p.z., the guide states that the stocking rates are extremely variable and are a function of slope, rock and brush condition. For Limy Upland, 7 to 10 inch p.z., because the guide does not give an estimate for stocking level for a poor condition site, this was left blank in the standard format—both high and low estimates.

Arkansas

Arkansas had a total of 44 Range Site Descriptions³ identified by Region and MLRA. The range sites were all dated 1962 and represent the soils classification in use at that time.

²On file at SCS State Office: Range Conservationist, SCS, Suite 200, East Indianola, Phoenix, Ariz., 85012.

³On file at SCS State Office: Range Conservationist, Federal Office Building, Room 2405, 700 West Capitol Avenue, Little Rock, Ark. 72201.

Soils Information

Each range site description reported significant soils associated with that range site. These soils are from an older soils classification, and the texture descriptions were non-standard with respect to this data base. Thus, the soils were coded as they were described in the range site description; but the texture descriptions were redefined using the SCS standard definitions. The Arkansas original texture codes and their translation in this data base are given in table 3.

Slopes for Arkansas were taken from the topography section of the range site descriptions and described general conditions for the range site. No slopes were used in the Arkansas range site descriptions to define range sites.

Total Annual Production

Total annual production was reported as a range of annual herbage yield for all range sites. The lower end of the range was coded as production in unfavorable years and the upper end as production in favorable years.

Initial Stocking Rates

No initial stocking rates were given.

California

California had 189 Range Site Descriptions⁴ identified by Region, MLRA, and subresource areas. California used additional subresource areas that were not on the 1978 map and counties to further subdivide the state. The Subresource areas represent Land Resource Area Evapotranspiration Zones. The evapotranspiration codes appear within the range site name for several range sites. All range site-soil combinations were coded with a subresource area within the MLRA code. Range sites were specific to a county in California in fewer than 2% of the cases, and county was not recorded in this data base.

Soils Information

Most range sites had soil mapping units or soil series names given in the taxonomic group. Soil mapping unit numbers given in the guides were not coded into this data base. Soils 5 numbers associated with soil series were available for most soils. Range sites without associated soils included Loamy Hardpan 10 to 12 inch and 12 to 14 inch MLRA 21D, North Slope Shallow Coarse Loamy, North Slope Shallow Loamy, North Slope Shallow Stony Loam 14 to 16 inch and 14 to 16 inch, North Slope Stony Loam, Shallow Coarse Loamy 14 to 16 inch MLRA 21D, Shallow Loamy 10 to 12 inch and

⁴On file at SCS State Office: Range Conservationist, SCS, 2828 Chiles Road, Davis, Calif. 95616.

Table 3.—Translation of Arkansas soil texture and texture modifiers into the standard abbreviations used for all states.

Arkansas Codes	Texture term	Modifier code	Texture code	Phase/class code
CHSIL	Cherty silt loam	CR	SIL	-
CHL	Cherty loam	CR	L	
COCHSIL	Coarse cherty silt loam	CRC	SIL	
COL	Coarse loam	-	COL	
CO	Coarse	-	CO	
FSL	Fine silt loam-silt	-	FSL	Silt
FSLM	Fine silt loam mounded	-	FSL	Mounded
FCHSIL	Fine cherty silt loam	FCR	SIL	
GC	Gravelly clay	CR	C	
GVFSL	Gravelly very fine sandy loam	CR	VFSL	
GFSL	Gravelly fine sandy loam	GR	FSL	
GSICL	Gravelly silty clay loam	GT	SICL	
GSIL	Gravelly silt loam	GR	SIL	
GL	Gravelly loam	GR	L	
GLFS	Gravelly loamy fine sand	GR	LFS	
GSL	Gravelly sandy loam	GR	SL	
GSTFSL	Gravelly and stoney fine sandy loam	GR	FSL	Stony
GSTSL	Gravelly stoney sandy loam	GR	SL	Stony
GLS	Gravelly loamy sand	GR	LS	
LSM	Loamy sand mound	-	LS	Mounded
LSUB	Loamy subsoil	-	L	Subsoil

12 to 14 inch, Shallow Stony Loam 10 to 12 inch and 12 to 14 inch, Stony Loam 10 to 12 inch and 12 to 14 inch, Very Shallow Stony Loam 10 to 12 inch and 12 to 14 inch.

Total Annual Production

Total annual production was given in pounds per acre for most range sites for favorable and unfavorable years. The more recent range site descriptions also included normal year production.

The guide states that the Steep Gravelly Loam range site in MLRA 15D and the Steep Loamy range site in MLRA 15D and 15E has very low potential for livestock grazing, because these soils have naturally dense brush with very steep slopes, making accessibility very difficult. No annual production or stocking rates were given for this range site. Total annual production for Gravelly Loam MLRA 18D was reported as current year's growth, air dry herbage production only. No annual production was given for Shallow Coarse Loamy MLRA 21 and MLRA 26; this site provides a small amount of usable forage for livestock. It is accessible; but the guide reports a shortage of water on this site.

Many of these range sites have a large amount of unusable forage for domestic livestock. Thus, the total annual production represents total production. The usable portion could be less than 50% of this total. A few of the range sites gave the useable forage present, either based on the proper grazing use of key species by livestock and/or wildlife (Clay Basins range site 10 to 12 inch, and 12 to 14 inch MLRA 21D) or based on leaving a set amount of mulch for soil protection and forage production (Clayey Bottomland MLRA 14 and 15), or based on

leaving a set amount of mulch for soil protection and forage production and adjusting for the slope (Coastal Gravelly Loam MLRA 15). Stocking rates become important in interpreting the domestic livestock use on each site.

Initial Stocking Rates

The coastal regions, Sacramento and San Joaquin Valleys, Sierra foothills, and Southern California Coastal Plains (MLRA 5, 14, 15, 17, 18, 19) did not give initial stocking levels by condition classes. Stocking rates for these MLRAs were commonly reported for favorable, normal, and unfavorable years. These values were not coded into the data base.

Range site guides for MLRAs 21, 22, 23 and 26 reported initial stocking levels by condition classes. All range sites within MLRA 21D have initial stocking rates except range site Stony Loam (the major portion of this site is not grazed by livestock because of the steep slopes and stoniness). In MLRA 22, all range sites had initial stocking rates except Semiwet Meadow (stocking rates given in favorable and unfavorable years).

Colorado

Colorado had 151 Range Site Descriptions⁵ identified by Region and MLRA. Range sites dated 1980 and after are coded in this data set with the Colorado range site number in the range site name.

⁵On file at SCS State Office: Range Conservationist, SCS, Diamond Hill, Bldg A, 3rd Floor, 2490 West 26th Avenue, Denver, Colo. 80211.

Soils Information

Soil series was the most common soil taxonomic unit used, and the Soils 5 number was available for 95% of the sites. For a small number of sites, the soil taxonomic units included a general characterization of soils, such as Alluvial Land complex for range site Loamy Plains in MLRA 69B, and Wet Alluvial Land in range site Wet Meadow in MLRA 67. These general characterizations were coded into the soil taxonomic unit category in this data base but do not have Soils 5 numbers. No soils were given for these 16 range sites: Loamy Breaks in MLRA 34 and 48; Limestone Hills in MLRA 47, 48 and 34; Loamy Slopes in MLRA 47, 34 and 48; Shallow Slopes in 48; Sandy Salt desert in 34, 35, 37; Clayey Salt desert in MLRA 34, 35; Salt desert Breaks in MLRA 34, 37.

Total Annual Production

Total annual production was given for favorable and unfavorable years as well as the median year. All range sites had total annual production values.

Initial Stocking Rates

Initial stocking rates were given by condition class for range sites dated after 1980. For range sites dated before 1978, no stocking rates were given. Initial stocking rates were based on an average growing season, and 1200 pounds of forage (air-dry) per AUM. This figure accounts for vegetation that disappears through trampling, small herbivores, etc., which the guide states averages approximately 7.9 pounds per day under normal conditions.

Florida

Thirteen range sites were described in Florida⁶. No substate divisions were used and no representative soils were given. Thus, there are 13 range site-soil combinations for Florida.

Soils Information

Soils were described for each site but no representative soils were named in the range site descriptions.

Total Annual Production

The average annual production of air dry plant material was reported for favorable years and unfavorable years for all range sites.

Initial Stocking Rate

Initial stocking rate was reported by condition class for each range site in acres/animal unit. This was as-

⁶On file at SCS State Office: Range Conservationist, SCS, 401 S.E. First Avenue, Gainesville, Fla. 32601.

sumed to represent year-long grazing; therefore, this value was divided by 12 to obtain a monthly value: acres per AUM. On forested range sites, the forest overstory affects the initial stocking rates. On all forested range sites, if the canopy cover exceeds 60%, there will be little or no grazing. For range sites Cutthroat Seep, Everglades Flatwoods, Longleaf pine-turkey oak hills, North Florida Flatwoods and South Florida Flatwoods, the stocking rates should be reduced by 10% for every 15% over 25% canopy cover. For Upland Hardwood Hammocks, stocking rates should be reduced 10% for every 15% over 35% canopy cover. On Sand Pine Scrub, the stocking rates should be reduced 10% for every 15% over 40% canopy cover. Values coded into the data base represent the base value.

Idaho

Idaho has 265 Range Descriptions⁷ identified by Region and MLRA. Precipitation zones were used to subdivide MLRAs. Plant community descriptions were given for most range sites. The descriptions included dominant species (up to three) abbreviated with the 4-letter code (first 2 letters of genus and species). For example, Shallow Stony 16 to 22 inch p.z. range site has plant community AGSP/FEID which is bluebunch wheatgrass and Idaho fescue. There are occasionally range sites occurring in the same MLRA and precipitation zone with different plant communities. For example in MLRA 10A and the 12 to 16 inch precipitation zone, Clayey range site occurs as Clayey ARTRY/AGSP (threetip sagebrush/bluebrush wheatgrass) and Clayey ARLO/FEID (alkali sagebrush/Idaho fescue).

Range sites without plant communities were: Wet Meadow Saline MLRA 28; Steep Slopes 16 to 22 inch p.z. MLRA 47; Loamy 22 inch plus p.z. MLRA 47; Shallow Loamy (Mahogany) 16 to 22 inch p.z. MLRA 43, 47; Gravelly 8 inch p.z. MLRA 11B, 12, 28; Shallow Fractured 7 to 12 inch MLRA 11B; Dense Clay 12 to 16 inch p.z. MLRA 25, 28, 47; Loamy 16 to 22 inch p.z. MLRA 25, 28, 47; Riverbottom MLRA 25, 28, 47; Stony 8 to 12 inch p.z. MLRA 25, 28; Stony 12 to 16 p.z. inch, MLRA 47.

Soils Description

Twenty-five percent of the range sites were missing soil series names. The Soils 5 number was available for most soil series.

Total Annual Production

Production was given as air dry average annual production for favorable, median, and unfavorable years in pounds per acre. Only two range sites did not have annual production estimates: Loamy MLRA 11 and Semi-wet Meadow MLRA 25.

⁷On file at SCS State Office: Range Conservationist, SCS, 304 North 8th Street, Room 345, Boise, Id. 83702.

Initial Stocking Rates

No initial stocking rates were given.

Kansas

Kansas had 63 Range Site Descriptions⁸ identified by Region and MLRA. Precipitation ranges were given by MLRA and this information was coded in this data base. These 63 range sites represented the currently revised range site guides for Kansas.

Soils Information

From 1 to 10 characteristic soils were given for each range site. Soils 5 numbers were also available as series was the most common soil taxonomic unit. Some range sites had characteristic soils such as alluvial land, or complexes which were coded into the soil taxonomic unit category and these do not have Soils 5 numbers. Some soils were occasionally to frequently flooded. This was coded in the phase/class description according to the abbreviations in appendix 4: OCCAS to FREQ.

Total Annual Production

For all range sites, total annual production was given for favorable, unfavorable and normal years for an excellent condition site. These production figures were based on available clipping data. The guide notes that the vigor of principal forage species, time of burning if fire is used, and growing conditions, will influence annual herbage production. Only normal year production was reported for the Saline Subirrigated range site because the subirrigated condition tends to nullify the effect of precipitation.

Initial Stocking Rate

For all range sites, initial stocking rates were given by condition class. Values were given for Acres/AU year-long, and AUM per acre. A range was given for Acres/AU year-long and, only one value for AUM per acre (the high value of Acres/AU transformed). As a range of values were desired for this data base, the Acres/AU year-long grazing values were used here. Because these values represented year-long grazing, the rates were divided by 12 to obtain Acres per animal unit month which then were stored in the data base. These guidelines were described in the range site description as safe initial stocking rates from which a sound management program could be built. The guide notes that grazing only during the dormant season or use of a specialized grazing program may allow an increase in the stocking rate.

⁸On file at SCS State Office: Range Conservationist, 760 S. Broadway, Salina, Kans. 67401.

Louisiana

There were two range sites described for Louisiana⁹. Both sites occurred in the Gulf Coast Marsh MLRA. One site had one soil and the other site had three soils associated with it; thus there were four range site-soil combinations for Louisiana.

Soils Information

Representative soils were given for each range site. As soil series were given, the Soils 5 numbers were available also.

Total Annual Production

Total annual production was given as air-dry herbage by condition class rather than by climatic year. For this data base, the excellent condition herbage production was coded in the favorable year category and the poor condition range in the unfavorable year category. No median year value was given.

Initial Stocking Rates

Initial stocking rates were given by condition class for all range sites.

Montana

There are 122 Range Site Descriptions¹⁰ identified by Montana Land Divisions and precipitation zones within the Land Divisions. There are 9 divisions in the Montana Land divisions (table 4). Regions and MLRAs were not used to subdivide Montana.

Soils Information

The number of soils associated with each range site varied from 1 to 7. Series were the most common unit. Soils 5 numbers were available for most of these soils. The 21 range sites that do not have soils are: Panspots (EGP), Shale (EGP) (this site provides very little forage for grazing animals), Very Shallow (EGP 10 to 14 inch p.z.) (this site provides limited forage for grazing animals), Sands (ESP 15 to 19 inch p.z.), Shallow Clay (ESP 15 to 19 inch p.z.), Thin Breaks (ESP 10 to 14 inch p.z.), Wet Meadow (ESP 10 to 14 inch p.z.), Very Shallow (ESP 15 to 19 inch p.z.), Stony (FM 10 to 14 inch p.z.), Very Shallow (FM, 20 inch plus p.z.) (this site has limitations for livestock because of inaccessibility and short growing season), Panspots (WGP 10 to 14 inch p.z.),

⁹On file at SCS State Office: Range Conservationist, SCS, 3737 Government Street, Alexandria, La. 71301.

¹⁰On file at SCS State Office: Range Conservationist, SCS, 32 E. Babcock, Bozeman, Mont. 59715.

Table 4.—Montana Land Divisions, precipitation zone, and code used in the standard format.

Land division	Precipitation (inches)	Code
Eastern Glaciated Plains	10-14	EGP
Eastern Sedimentary Plains	10-14	ESP
Eastern Sedimentary Plains	15-19	ESP
Western Glaciated Plains	10-14	WGP
Foothills and Mountains	10-14	FM
Foothills and Mountains	15-19	FM
Foothills and Mountains	20 +	FM
Western Sedimentary Plains	5-9	WSP
Western Sedimentary Plains	10-14	WSP

Shale (WGP 10 to 14 inch p.z.) (this site provides little forage for grazing animals), Shallow Clay (WGP 10 to 14 inch p.z.), Clayey (WSP 5 to 9 inch p.z.), Gravel (WSP 10 to 14 inch p.z.) (low grazing values because of lack of production), Panspots (WSP 10 to 14 inch p.z.), Saline Upland (WSP 10 to 14 inch p.z.), Sands (WSP 10 to 14 inch p.z.), Shallow to Gravel (WSP 10 to 14 inch p.z.), Thin Breaks (WSP 10 to 14 inch p.z.), Very Shallow (WSP 10 to 14 inch p.z.).

Total Annual Production

All but 2 of the 122 range sites have total annual production reported as air dry weight in pounds per acre on excellent condition ranges in favorable, unfavorable, and median years. The Silty range site in ESP 15 to 19 inch p.z. reported only favorable and unfavorable years, and the Subirrigated range site in WSP 10 to 14 inch p.z. did not report annual production.

Initial Stocking Rates

Initial stocking rates were given for all range sites in Montana by condition class.

Nebraska

Nebraska had 80 Range Site Descriptions¹¹ identified by Nebraska Vegetation zones, Regions, and MLRAs. Nebraska Vegetation zones are the former Nebraska Precipitation zones (table 5).

Soils Information

The number of major soil taxonomic units associated with each range site varied from 1 to 17. Soil series were given most often for the taxonomic unit and thus the Soils 5 numbers were available for most soils. Texture definitions were usually given with the soils.

Total Annual Production

Total annual production in excellent range condition was defined for all range sites. Average production for below average conditions, average conditions and above average conditions were given for most range sites. Production values for the average condition were missing for a few range sites.

Initial Stocking Rates

Initial stocking rates were given for all range sites by condition class.

Nevada

Nevada had 210 Range Site Descriptions¹² identified by MLRA. Precipitation zones were used to subdivide the MLRAs.

¹¹On file at SCS State Office: Range Conservationist, SCS, Federal Building, Room 345, 100 Centennial Mall North, Lincoln, Nebr. 68508.

¹²On file at SCS State Office: Range Conservationist, SCS, 50 South Virginia Street, Reno, Nev. 89505.

Table 5.—Nebraska Land Division Codes.

Zone	Counties
I	Sioux, Box Butte, Scotts Bluff, Morrill, Banner, Kimball, Cheyenne
II	Dawes, Sheridan, Cherry, Garden, Grant, Hooker, Thomas, Arthur, McPherson, Logan, Deuel, Keith, Lincoln, Perkins, Chase, Hayes, Frontier, Dundy, Hitchcock, Redwillow
III	Keya Paha, Boyd, Brown, Rock, Holt, Blaine, Loup, Garfield, Wheeler, Custer, Valley, Greeley, Sherman, Howard, Dawson, Buffalo, Hall, Gosper, Phelps, Kearney, Adams, Clay, Furnas, Harlan, Franklin, Webster, Nuckolls, Knox, Cedar, Dixon, Antelope, Pierce, Wayne, Boone, Nance, Merrick, Hamilton
IV	Dakota, Thurston, Madison, Stanton, Cuming, Burt, Platte, Colfax, Dodge, Washington, Polk, Butler, Saunders, Douglas, Sarpy, York, Seward, Lancaster, Cass, Otoe, Fillmore, Saline, Thayer, Jefferson, Gage, Johnson, Nemaha, Pawnee, Richardson

Soils Information

Only one representative soil series was given for each range site. Only one-third of the sites had soils associated with them. In a few cases, several textures were given for the same soil. These descriptions range from soil series to families to orders. Soils 5 numbers were available for most series.

Total Annual Production

All range site descriptions reported total annual production in air-dry weight in pounds per acre for favorable, unfavorable years, and normal years.

Initial Stocking Rates

No initial stocking rates were given.

New Mexico

New Mexico had 202 Range Site Descriptions¹³ identified by MLRA. In addition, subresource areas were used to further define range sites.

Soils Information

Most range sites with soil taxonomic units have the Soils 5 number. A few range sites had rock outcrop complexes or associations that do not have Soils 5 numbers. Out of the 990 combinations, only 12 range sites did not have a soil taxonomic unit: Loamy Savannah (D36A), Sandy (D36A), Mountain Shale (E48B), Bottomland (E51A and E51B), Dry Loamy (E51A), Gravelly loam (E51A), Salt Meadow (E51A and E51B), Gravelly Slopes (E51B), Limestone Hills (G70C), Shallow Plains (G70C).

Total Annual Production

All range site descriptions report total annual vegetation produced in average air-dry weight in pounds per acre for favorable and unfavorable years. About one tenth of the sites also include the average production.

Initial Stocking Rates

All 990 range site-soil combinations reported an initial stocking rate by condition class. The range sites dated 1978 reported stocking rates for favorable and unfavorable years. The favorable years were reported in this data base.

¹³On file at SCS State Office: Range Conservationist, SCS, 517 Gold Avenue, S.W., Room 3301, Albuquerque, N. Mex. 87102.

North Dakota

North Dakota had 59 Range Site Descriptions¹⁴ identified by 8 Vegetation zones. Precipitation was defined for each Vegetation zone (table 6). No range sites were described for the Red River Valley vegetation zone. Range sites from the adjacent vegetation zones are to be used for this zone. Region and MLRA were not used to further divide North Dakota. Stocking Rate revisions dated April 1984 have not yet been incorporated into this data base.

Soils Information

Soil taxonomic units common to each range site were given for all range sites. The number of soil taxonomic units associated with each range site varied from 1 to 17. Commonly a range site was associated with a given soil and several textures. Soil series was used; therefore, the Soils 5 number associated with the series was available for all range sites. Occasionally, a general description of soils associated with the range site was given, (e.g., saline alluvial lands for the range site Saline Lowland). This soil taxonomic unit was coded in the data base under soil name; but no Soils 5 number would be available here. This data set may be missing the less common soil types within a range site.

Total Annual Production

Total annual production in excellent condition was given for all range sites in pounds per acre. A range of values were given representing the variability in growing conditions. No average values were reported.

Initial Stocking Rates

All range sites had recommended initial stocking rates based on condition classes given in the range site descriptions. Stocking rates were given for average years, recognizing that adjustments may be necessary to take into account local conditions, seasonal moisture levels, and inaccessibility. Tabular values recorded in this data base retain the assumption of continuous season-long grazing noted in the guide. Values in the guide were AUMs per acre, and these values were inverted to obtain acres/AUM prior to storing in this data base.

Oklahoma

Oklahoma had 100 Range Site Descriptions¹⁵ identified by Region and MLRA. The table of contents (re-

¹⁴On file at SCS State Office: Range Conservationist, SCS, Rosser Avenue and Third Street, Federal Building, Room 270, Bismark, N. Dak. 58501.

¹⁵On file at SCS State Office: Range Conservationist, SCS Agricultural Center Building, Farm Road and Brumley Street, Stillwater, Okla. 74074.

Table 6.—North Dakota vegetation zones.

Code	Vegetation Zone (inches)	Precipitation
1	Badlands (Wheatgrass-grama-stipa-artemisia)	13-15
2	Missouri Slope (Wheatgrass-stipa-grama)	15-16
3	Coteau (Wheatgrass-stipa-snowberry)	14-17
4	Central (Wheatgrass-stipa-snowberry)	16-18
5	Drift Prairie (Wheatgrass-bluestem-stipa-snowberry)	16-18
6	Border (Wheatgrass-bluestem-stipa-quercus)	16-18
7	Altamont (Wheatgrass-bluestem-stipa-snowberry)	17-20
8	Red River Valley (Bluestem-panicum-stipa) (no range sites were given for this zone)	18-20

vised 10/79)¹⁵ shows a Loamy Prairie (40 inch plus p.z. Southern) but no range site description was available for this site.

Soils Information

Soils were described for all but one range site. The number of soils associated with each range site varied from 1 to 4. Occasionally, several textures were used to further specify a soil associated with a range site. Soil series were used for 50% of the range sites. Range sites also reported land types, such as alluvial land, subirrigated lowland, or broken land. These descriptions were coded in the soil taxonomic unit category and do not have Soils 5 numbers. Complexes were also reported under soils in the range site description. These soils also were coded in the soil taxonomic unit category and do not have Soils 5 numbers. The only range site without a soil unit was Loamy Plains in MLRA 78.

Total Annual Production

Production for all sites was reported by favorable and unfavorable years. Yields were estimated from limited clipping information. Sites such as Breaks GP, Breaks (40 inch plus p.z.) and Deep Sand Savannah Breaks (28 to 32 inch p.z.) reported values for herbaceous species and for woody species and a total. The values for woody species averaged 15% of the total in favorable years and 18% of the total production in unfavorable years. Only the total production value was recorded in this data base. Other range sites support a crown canopy cover of woody species ranging from 10% to 40% in the climax condition. For these sites, no woody species production was reported and production data was reported as total herbage yields in the guides.

Initial Stocking Rates

No initial stocking rates were given.

Oregon

Oregon had 226 Range Site Descriptions¹⁶ identified by Region and MLRA. No other divisions were used to classify range sites. Sites with less than 15% tree canopy cover were described as range sites. Sites with tree canopy cover exceeding 15% were described as a Grazeable Woodland Site. Only sites described as range sites were coded into this data base. Sites with juniper as a dominant fell into the range site category, whereas, sites dominated by ponderosa pine were described as grazeable woodland sites and were not included in this data base. An attempt was made to incorporate the revisions noted on the range sites. For some MLRAs, range sites were not fully described. These sites were included into the data base to facilitate updating, but will not contain a complete set of information on production, soils or initial stocking levels.

Soils Information

Soils information was available for nearly all ranges sites in MLRAs 7, 8, 9, 21 and 43. Only 50% of the range sites in MLRAs 5, 10, 6, 23, and 24 had representative soils described. The number of soil taxonomic units associated with a range site varied from 1 to 10. Most soil taxonomic units were series and the Soils 5 numbers were available. Families, complexes and orders were also used to describe the soil taxonomic unit.

Total Annual Production

Less than one-third of the range sites reported a total annual production value. Average year production was given most often; however, some sites reported values for favorable and unfavorable years also.

¹⁶On file at SCS State Office: Range Conservationist, SCS, Federal Building, 16th Floor, 1220 S.W. Third Avenue, Portland, Ore., 97204.

Initial Stocking Rates

Stocking rates were given by condition class for nearly all range sites. On the Rough site, no stocking rate was given for the excellent condition range; therefore, both the low and the high values for excellent condition were left blank. On some sites, an initial stocking rate and a potential stocking rate (10–15 years of good management) were given. For this data base, only the initial stocking rate was coded.

South Dakota

South Dakota had 84 Range Site Descriptions¹⁷ identified by Region and MLRA.

Soils Information

All range sites had significant soils described. The number of soils associated with each site varied from 1 to 13. For most sites, soil series was used. Thus, Soils 5 numbers were available. For Saline Lowland East Central in MLRA 53B, several soil series were given. In addition, the saline phase of other alluvial soils was also described as a significant soil for this range site. This soil type was coded into the soil taxonomic unit without a Soils 5 number. Similarly, for Saline Lowland Western in MLRA 58D, several soils were given as well as saline alluvial land. In Very Shallow Western in MLRA 60A, gravelly land was described as a significant soil. These general descriptions of soils were coded in the soil taxonomic unit without a Soils 5 number.

Total Annual Production

Total average annual air-dry production of the typical soil in each range site was given. The variation in herbage production from soil variability within each site was also given. Production variation as a function of climate was given as a percent of the average annual production. The increase from favorable climatic years varied from 10% to 20% higher than average. The decrease from unfavorable years varied from 30% to 40% less than average years. The increase in favorable years was about the same as the high end of the production resulting from soil variability. The decrease in unfavorable years was lower than the low end of the production resulting from soil variability. The range in production resulting from soil productivity, not climate related, was coded in the South Dakota data base. The variability from weather could be determined by applying a computation on the average total production.

Initial Stocking Rates

Initial stocking rates based on general averages were given as a guide in planning. Past grazing history may

¹⁷On file at SCS State Office: Range Conservationist, SCS Federal Building, Room 203, 200 4th Street S.W., Huron, S. Dak. 57350.

show that the rates suggested were too high or too low for a particular pasture. The guide notes that an on-site evaluation of all factors affecting grazing use within a pasture should be made before the initial stocking rate is proposed. Seasonal and annual variation in forage production will require timely adjustments in stocking rates to assure proper grazing use. Stocking rates were given in AUMS per acre by condition classes.

Texas

Texas had 827 Range Site Descriptions¹⁸ identified by State Area, Region and MLRA. There are 27 State Areas. In addition, the state was divided into potential evapotranspiration (PE) zones, and range sites were associated with a PE zone. Sites described as Woodland Sites were not included in this data base. Eight sites from the Soil and Vegetation Groups described for Area 11 were not included, because grazing levels were defined by canopy classes.

Soils Information

Soil taxonomic units which characterize range sites were given for approximately two-thirds of the range sites. The number of soils associated with a range site varied from 1 to 8. Soil series was the most common soil unit, and the Soils 5 numbers were available for these soils. Textures were commonly given for the soil series. For some range sites, land types or general descriptions of soils were given in the soil taxonomic units. For example, sandy alluvial land was associated with the range site Sandy Bottomland in Area 3. These general descriptions were coded in the soil taxonomic unit variable in this data base.

Total Annual Production

Most range sites had total annual production given for favorable and unfavorable years. An average total production was estimated for this data base by averaging the favorable and unfavorable values reported in the guides.

Initial Stocking Rates

Initial stocking rates were given for most range sites by condition class. Rates were given as acres per animal unit per year-long grazing. These values were divided by 12 to obtain a monthly value, acres per AUM, and then were stored into this data base.

Utah

Utah had 84 Range Site Descriptions¹⁹ identified by Region and MLRA. Utah did define a Utah Land Re-

¹⁸On file at SCS State Office: Range Conservationist, SCS, 101 S. Main Street, Temple, Tex. 76501.

¹⁹On file at SCS State Office: Range Conservationist, SCS, 4012 Federal Building, 125 South State Street, Salt Lake City, Ut. 84147.

source Unit code in the range site descriptions; but this was not coded into this data base. The 32 Woodland Eco-systems were not included in this data base.

Soils Information

The number of significant soils associated with each range site varied from 1 to 29. Soils series were the most common soil taxonomic unit; therefore, the Soils 5 numbers were available for nearly all of the range sites. Land types or general descriptions of soils occasionally were given as a significant soil (e.g., mixed alluvial land in range site Wet Meadows in MLRA 25). These general descriptions were coded in the soil taxonomic unit variable in this data base. No soils were reported for the Desert Bottoms range site, Semidesert Sand (juniper), Semidesert Shallow Hardpan, Upland Limy Loam (summer precipitation), Upland Shallow Hardpan (summer precipitation), Desert Shallow Loam, Semidesert Gravelly Loam (summer precipitation), Semidesert Sand (summer precipitation), Upland Stony Loam (summer precipitation), Upland Sand (summer precipitation), Upland Shallow Loam (summer precipitation), High Mountain Loam (summer precipitation), Upland Shale, Upland Stony Clay.

Total Annual Production

All range sites reported total annual production for favorable, unfavorable, and median years for an excellent condition site. Yields also were reported separately by condition class by favorable and unfavorable year. A range was given within each condition class for favorable and for unfavorable years. The number of plots upon which estimates of yield were made varied from 7 to 70, depending upon the range site. For excellent condition class, the upper limit of each climatic year was the estimate of total annual production first reported in the guide. Thus, the unfavorable year estimate is slightly higher than the estimated yields reported by condition classes. The initial estimates of yields were used in this data base.

Initial Stocking Rates

No initial stocking rates were given.

Washington

Washington had 25 Range Site Descriptions²⁰ identified by Region and MLRA. Precipitation was used to divide the state. Range sites were dated from 1981 to 1983. Woodland sites were not included in this data base.

²⁰On file at SCS State Office: Range Conservationist, SCS, 360 U.S. Courthouse, West 920 Riverside Avenue, Spokane, Wash. 99201.

Soils Information

All range sites have soils associated with them. The number of soil series or soil mapping units associated with each range site varied from 1 to 6. Texture and slopes were commonly associated with each soil. Soils 5 numbers were available for 95% of the soils.

Total Annual Production

All range site descriptions reported a total annual production for favorable and unfavorable years as well as the median years.

Initial Stocking Rates

All range site descriptions reported initial stocking rates by condition class. Stocking rates were based on 900 pounds of forage per AUM.

Wyoming

Wyoming had 250 Range Site Descriptions²¹ identified by state land division zone, Region, and MLRA. The state land divisions were based on precipitation zones (table 7). Within the state land division, the Region and MLRA classifications were used to further subdivide the state. Both the precipitation and the state land division code were coded into the data base. Precipitation for the Mountains land division was reported as 20 inch plus. This was coded into the data base as 20 in the first precipitation columns (Card 3 col 1-2) and + in the second precipitation columns (Card 3 col 5-6). A common set of range site names was used across the precipitation zones. That is, the name Shallow Loamy was used within the 20 inch plus Mountains zone and the 15 to 19 inch Foothills and Mountains West zone; but the range site descriptions reflect the zone conditions.

²¹On file at SCS State Office: Range Conservationist, SCS, Federal Building, Room 3124, 100 East "B" Street, Casper, Wyo. 82601.

Table 7.—Wyoming state land divisions.

Code	Topographic Precipitation Zone
A	20" + Mountains
B	15" - 19" Foothills and Mountains West
C	10" - 14" Foothills and Basins West
D	7" - 9" Green River and Great Divide Basin
E	5" - 9" Big Horn and Wind River Basin
F	15" - 19" Foothills and Mountains East
G	10" - 14" Foothills and Foothills East
H	10" - 14" High Plains Southeast
I	15" - 19" Northern Plains
J	15" - 19" Foothills and Mountains Southeast
K	12" - 14" Southern Plains
L	15" - 17" Southern Plains
M	15" - 17" Northern Plains
N	10" - 14" Northern Plains
O	15" - 19" Blackhills
P	20" - 24" Blackhills (Woodland site)

Soils Information

Soil taxonomic units reported for range sites varied by zones. Most range sites within zones 2, 5, 6, 7, 12, 13, and 14 had soils associated with the site. In zones 3 and 4, less than 50% of the sites had soils associated with them. In zones 1, 8, 9, 10, 11, and 16, no soils were reported for the range sites. If a soil taxonomic unit was reported, it usually was the soil series; therefore, the Soils 5 numbers were available.

Total Annual Production

All range site descriptions reported total annual production for favorable and unfavorable years as well as the median years. These production values are for range sites in excellent condition.

Initial Stocking Rates

All range site descriptions reported an initial stocking rate by condition class in acres per AUM.

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APPENDIXES STRUCTURE OF COMPUTER FILES

Twenty individual state files contain range site description information. All files are stored on tape at the Fort Collins USDA Computer Center. The following job control language will allow read-only access to the tape, and copy 1 state file to disk space on the user's FCCC account. The control language could be modified to read more than one state file.

```
@ASG,T SCSRS*WEST-STATES., U9S, FS5966
@ASG,UP MYFILE,F///XXXX
@COPIN,S SCSRS*WEST-STATES.AZ,MYFILE
```

The tape is numbered FS5966. The maximum number of tracks required for a single state is 200. The default on the FCCC Univac is less than 200, so the user must specify the number of tracks using F///XXXX where XXXX is the number of tracks desired. To copy the en-

tire tape onto disk would require 751 tracks. The state files are named SS where ss is the two letter state abbreviation. The order of the elements on the tape is as follows:

CA, CO, ID, MT, NV, NM, OR, UT, WA, WY, AR, FL,
KS, LA, NE, ND, OK, SD, TX.

Each state file contains the range site-soils data in a four card standard format (Appendixes 1 and 2). This data set represents all range site descriptions as of 1984 for these 20 states. For this data set only, the sequence number identifies each range site-soil combination within each state. The number of range site-soil combinations within each state will exceed the number of range site descriptions because all MLRA-range site-soils combination were identified in order to link with other national level data bases. Data elements were described in the text under the Structure of Rangeland Data, and the individual state variations in the data were described within each state section.

Appendix 1.—Standard format for all range sites in RANGE FORAGE data base. For data definitions, see Appendix 2.

Card	Column	Contents
1	1-5	Sequence Number (numeric)
1	8-9	State Postal Code Abbreviation (alphanumeric)
1	12	Region (alphanumeric)
1	15-18	Major Land Resource Area (alphanumeric) (except Montana: Montana Land Resource Division, alpha)
1	21-24	New Mexico subresource area (alphanumeric) or Texas Area Code (numeric)
1	27-78	Range Site Name (alphanumeric)
2	1-6	Soils 5 Number (alphanumeric)
2	12-78	Soil Taxonomic Unit (alpha)
3	1-2	Precipitation zone: low (inches)
3	5-6	Precipitation zone: high (inches)
3	9-11	Texture modifiers (alpha)
3	14-17	Texture (alpha)
3	20-21	Slope: low (percent)
3	24-25	Slope: high (percent)
3	28-58	Phase/Class descriptions (alpha)
3	60-64	Total annual production: favorable year (lb/ac)
3	67-70	Total annual production: unfavorable year (lb/ac)
3	72-76	Total annual production: median year (lb/ac)
4	1-6	Initial stocking rate: excellent condition, low estimate. Units of acre/AUM.
4	8-13	Initial stocking rate: excellent condition, high estimate. Units of acres/AUM.
4	15-20	Initial stocking rate: good condition, low estimate. Units of acres/AUM.
4	22-27	Initial stocking rate: good condition, high estimate. Units of acres/AUM.
4	29-34	Initial stocking rate: fair condition, low estimate. Units of acres/AUM.
4	36-41	Initial stocking rate: fair condition, high estimate. Units of acres/AUM.
4	43-48	Initial stocking rate: poor condition, low estimate. Units of acres/AUM.
4	50-55	Initial stocking rate: poor condition, high estimate. Units of acres/AUM.
4	57-76	Plant communities in Idaho (alpha) or PE zones in Texas (alphanumeric).
4	73	Land divisions code for Nebraska (numeric), North Dakota (numeric), Wyoming (alpha).

Annual production — see Total Annual Production

Initial Stocking Rates — Initial stocking rates for domestic livestock grazing use are given for each range site in each of the four condition classes: poor, fair, good, excellent. See table 2 for a listing of the states which provided this information.

Land Division Codes — These codes describe divisions of a state unique to that state. Land Division Codes for Nebraska are given in table 5, for Montana in table 4, for North Dakota in table 6, and for Wyoming in table 7.

Major Land Resource Area (MLRA) — Land classification from USDA SCS 1981.

PE — see Potential Evapotranspiration

Phase/Class Description — Phase/class descriptions of soils were included in this data base if the phase or class description was used to further define the soil associated with the range site. Standard abbreviations for Phase/class descriptions from the SCS National Soils Handbook are given in Appendixes 2 and 3. If no abbreviation existed, the phase/class description was recorded in full.

Plant Communities — Plant communities descriptions were given for the range sites in Idaho. The description consists of the dominant species (up to three) abbreviated with the four letter code (first 2 letters of genus and species).

Potential Evapotranspiration Zones (PE) — Potential Evaporation Zones were used to further divide Texas. These were coded into a category in the data base. Other states, such as California, also reported potential evapotranspiration but not for all range sites. Hence, these states did have a separate category for PE. Refer to the state description to determine if PE was coded.

Precipitation Zone — If precipitation was given in the range site name, or state land division code, it was coded in the data base.

Range Site Name — Name given in the Range Site Description

Region — Land cover classification as defined by USDA SCS 1981

Sequence Number — Sequence number associated with each range site within a state.

Soils 5 Number — Unique number associated with soil series in the SCS data base called Soils Interpretation Record.

Soil Taxonomic Unit — Soil taxonomic unit used in the range site description to describe representative soils associated with the range site. Could be order, family, series.

State Code — United States Postal Code as defined in the SCS National Range Handbook.

Stocking Rate — see Initial Stocking Rate

Texture — Soil description used to further refine the soil associated with the range site. Standard abbreviations from the National Range Handbook, also given in Appendixes 2, 3, and 5.

Texture modifiers — Soil description used to further refine the soils associated with the range site. Standard abbreviations given in the National Range Handbook, and Appendix 3 of this report.

Total Annual Production — Total annual production air-dry in units of pounds per acre. Table 2 defines the states which provided this information. Values given in this data base for favorable, median, and unfavorable years.

Appendix 3.—Abbreviations for texture, texture, phase/class descriptions taken from National Soils Handbooks.

Texture modifier		Texture terms	
BY	Bouldery	COS	Coarse sand
BYV	Very bouldery	S	Sand
BYX	Extremely bouldery	FS	Fine sand
CB	Cobbly	VFS	Very fine sand
CBA	Angular cobbly	LCOS	Loamy coarse sand
CBV	Very cobbly	LS	Loamy sand
CBX	Extremely cobbly	LFS	Loamy fine sand
CN	Channery	LVFS	Loamy very fine sand
CNX	Extremely channery	COSL	Coarse sandy loam
CR	Cherty	SL	Sandy loam
CRC	Coarse cherty	FSL	Fine sandy loam
CRV	Very cherty	VFSL	Very fine sandy loam
CRX	Extremely cherty	L	Loam
FL	Flaggy	SIL	Silt loam
FLX	Extremely flaggy	SI	Silt
FLV	Very Flaggy	SCL	Sandy clay loam
GR	Gravelly	CL	Clay loam
GRC	Coarse gravelly	SICI	Silty clay loam
GRF	Fine gravelly	SC	Sandy clay
GRV	Very gravelly	SIC	Silty clay
GRX	Extremely gravelly	C	Clay
MK	Mucky	COL*	Coarse Loam
PT	Peaty	VCOL*	Very Coarse Loam
RB	Rubbly	CO*	Coarse
SH	Shaly	Terms used in lieu of texture:	
SHV	Very shaly	CB	Coprogenous earth
SHX	Extremely shaly	CEM	Cemented
SR	Stratified	CIND	Cinders
ST	Stony	DE	Diotomaceous earth
STV	Very stony	FB	Fibric material
STX	Extremely stony	GRAVEL	Gravel
SY	Slaty	GYF	Gypsiferous material
SYV	Very slaty	HM	Hemic material
SYX	Extremely slaty	ICE	Ice or frozen soil
		IND	Indurated
		MARL	Marl
		MPT	Mucky-peat
		MUCK	Muck
		PEAT	Peat
		SG	Sand and gravel
		SP	Sapric material
		UWB	Unweathered bedrock
		VAR	Variable
		WB	Weathered bedrock

*Abbreviations added for this data set, not standard.

Appendix 4.—Standard abbreviations for phase/class descriptions as defined in the National Soils Handbook.

AFFR – Annual Frost-free rainfall	NONE – No flooding
ALKALI	NONERODED
ALL	NONSALINE
BRIEF	NORTH – North or east aspect
CALC SURF – Calcareous surface	OCCAS – Occasional flooding
COASTAL	OVERWASH
CHANNELED	PARTIALLY DR – Partially drained
COLD	PE – Precipitation effectivity
COMMON – common flooding	PONDED
COOL	POORLY DR – Poorly drained
DEPTH	RANGELAND
DISSECTED	RARE – Rare flooding
DRAINED	ROCKY
DRY	SALINE
ELEV – elevation	SAL-ALK – Saline-alkali
ERODED	SER ER – Severely eroded
ETA – Evapotranspiration, actual	SHALLOW
FFS – Frost-free	SHORT FFS – Short frost-free season
FREQ – Frequent flooding	SLI ALKALI – Slight alkali
GULLIED	SLI SALINE – Slightly saline
HIGH ELEV – High elevation	SLI SAL-ALK – Slightly saline alkali
HIGH PE – High potential evapotranspiration	SMD – Soil moisture deficit
HIGH PPT – High precipitation	SOUTH – South or west aspect
HUMMOCKY	STR ALKALI – Strongly alkali
IRR – Irrigated	STR SALINE – Strongly saline
LONG	STR SAL-ALK – Strongly saline-alkali
LOW ELEV – Low elevation	SUBIRR – Subirrigated
LONG FFS – Long frost-free season	SW POORLY DR – Somewhat poorly drained
LOW PE – Low potential evapotranspiration	THICK SURF – Thick surface
LOW PPT – Low precipitation	THICK – Thick solum
MAAT – Mean annual air temperature	THIN SURF drained
MAP – Mean annual precipitation	UNDRAINED
MAST – Mean annual soil temperature	UNDULATING
MED PE – Medium potential evapotranspiration	WARM
MED PPT – Medium precipitation	WELL DR – Well drained surface
MOD ALKALI – Moderately alkali	WET
MOD DEEP – Moderately deep	WINTER PPT – Winter precipitation
MOD SAL-ALK – Moderate saline-alkali	WOODLAND
MOD SALINE – Moderately saline	V BRIEF – Very brief
MOD TEMP – Moderate temperature	V COLD – Very cold
MOD THICK	V LONG – Very long
MOD WELL DR – Moderately well	V POORLY DR – Very poorly drained
MOIST	V ROCKY – Very rocky
NIRR – Nonirrigated	V SHALLOW – Very shallow
NONCALC SURF – Noncalcareous surface	

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This paper documents the development and structure of the RANGE FORAGE data base, a subset of information from all Soil Conservation Service Range Site Descriptions for 20 states: Arkansas, Arizona, California, Colorado, Florida, Idaho, Louisiana, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, Wyoming. Information in the data set includes range site name, location identifiers, total annual production, soils information, and initial stocking level rates.

Keywords: Range site, forage production, western United States, stocking level, data base

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Rocky
Mountains



Southwest



Great
Plains

U.S. Department of Agriculture
Forest Service

Rocky Mountain Forest and Range Experiment Station

The Rocky Mountain Station is one of eight regional experiment stations, plus the Forest Products Laboratory and the Washington Office Staff, that make up the Forest Service research organization.

RESEARCH FOCUS

Research programs at the Rocky Mountain Station are coordinated with area universities and with other institutions. Many studies are conducted on a cooperative basis to accelerate solutions to problems involving range, water, wildlife and fish habitat, human and community development, timber, recreation, protection, and multiresource evaluation.

RESEARCH LOCATIONS

Research Work Units of the Rocky Mountain Station are operated in cooperation with universities in the following cities:

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Flagstaff, Arizona
Fort Collins, Colorado*
Laramie, Wyoming
Lincoln, Nebraska
Rapid City, South Dakota
Tempe, Arizona

*Station Headquarters: 240 W. Prospect St., Fort Collins, CO 80526